

8 Natural Resources

8.1 Introduction

Natural and environmental resources help define the character of Eastlake, support the natural systems that provide for wildlife and a healthy environment, provide recreational and educational opportunities, and form the basis of its economy. This begins with the Chagrin River, Lake Erie, stream valleys and watersheds, and remaining wooded tracts.

The intent of this element is to promote the conservation and integration of natural systems and resources with a growing residential population, and reduce the impacts of man-made development on the community, property and lives of the residents.

8.2 Floodplains / floodway

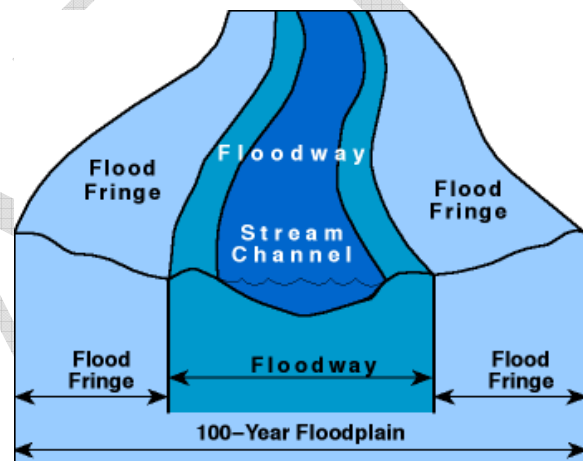
According to the Ohio Department of Natural Resources, the floodplain is divided into two areas based on water velocity: the floodway and the flood fringe (Map 8.1). The floodway includes the channel and adjacent floodplain area that is required to pass the 100-year flood without unduly increasing flood heights. This is the hazardous portion of the floodplain where the fastest flow of water occurs.

Due to the high degree of hazard found in the floodway, floodplain regulations require that proposed floodway developments do not block the free flow of flood water as this could dangerously increase the water's depth and velocity.

The flood fringe is the portion of the floodplain, outside of the floodway, that contains slow-moving or standing water. Development in the fringe will not normally interfere with the flow of water. Therefore, floodplain regulations for the flood fringe allow development to occur but require protection from flood waters through the elevation of buildings above the 100-year flood level or flood proofing buildings so that water cannot enter the structure.

The Ohio Department of Natural Resources records show 231 structures within the flood hazard area in Eastlake (Map 8.2). Since 1978, 219 losses have been paid from the NFIP totaling over \$1.8 million.

Map 8.1: Floodplain Graphic



100 Year Floodplain

100 Year Floodplain

Legend:

- Floodway
- Floodplain
- Buildings in floodplain

City of Eastlake
The Crown Jewel of Lake County

LAKE COUNTY PLANNING COMMISSION

Eastlake's existing flood damage prevention regulations are in Chapter 1367 of the building code. These regulations identify the 1981 flood insurance rate maps and associated flood insurance study as the basis for establishing areas of special flood hazard. These regulations establish minimum flood protection standards for buildings and other types of development in identified floodplains. These minimum standards require structures to be flood proofed or elevated above base flood elevations, anchoring of structures, and prohibit fill in floodways unless a property owner can verify that the base flood elevations will not be increased.

Due to the large number of structures and related losses in Eastlake, the City may consider adopting floodplain management standards that are more conservative than the minimum Federal standards that, when implemented, can reduce the potential of flood damage. These standards include adding:

Two Foot Freeboard

A "freeboard" is a safety factor expressed in feet above a flood level. Designating a minimum two foot freeboard helps compensate for unknown factors that can contribute to flood heights greater than the height calculated for the base flood and conditions such as wave action, obstructed bridge openings, debris and ice jams and the effects of urbanization in a watershed. Another advantage of a designated freeboard is the reduction in the cost of flood insurance. The insurance rates for new structures in special flood hazard areas are directly related to their lowest floor elevation compared to the base flood elevation. A disadvantage of freeboard includes potentially increased construction costs for structures, and more fill being placed in the special flood hazard areas if the method for elevating the structure is a fill pad.

Cumulative Substantial Damage and Substantial Improvement

This standard requires communities to track cumulative substantial damage and improvements in special flood hazard area to ensure that flood protection measures are incorporated into building reconstruction or repairs after a flood event or any event damaging a structure that was built before the effective date of the first flood insurance rate map (FIRM).

In addition, adding a cumulative substantial damage and improvement provision to the City's code will increase the availability of the *Increased Cost of Compliance* (ICC) flood insurance coverage for building owners. The ICC coverage will pay up to twenty thousand dollars beyond the flood insurance claim payment for compliance with local flood damage reduction regulations. If Pre-FIRM structures have been declared substantially damaged and are required to meet flood damage reduction regulations because of cumulative losses, the structure owner can only obtain ICC coverage if the community has adopted the cumulative provisions language. The additional standards do require that detailed records are kept up to the date of damages and improvements.

Fill Restrictions

Fill in floodplains can cause adverse impacts on adjacent property owners, water quality impacts due to increased turbidity and siltation, and loss of flood storage capacity. Minimum NFIP regulations include guidelines on the type of fill used in construction in a special flood

hazard area. Including higher standards regarding fill material would provide quality, stability and compaction standards for fill placed in flood hazard areas.

Foundation Design

The objective of the higher standard is to ensure proper design and construction of building foundations to protect building structural integrity against the effects of flood forces. In many cases foundation damage renders a structure uninhabitable or subject to extensive repairs. The minimum NFIP standard includes foundations design requirements for non-residential structures. The high standards extend these standards to residential structures.

(Resources: Ohio Department of Natural Resources. *Recommended Ohio Floodplain Regulation Criteria for Floodplain Management*. August 2006.

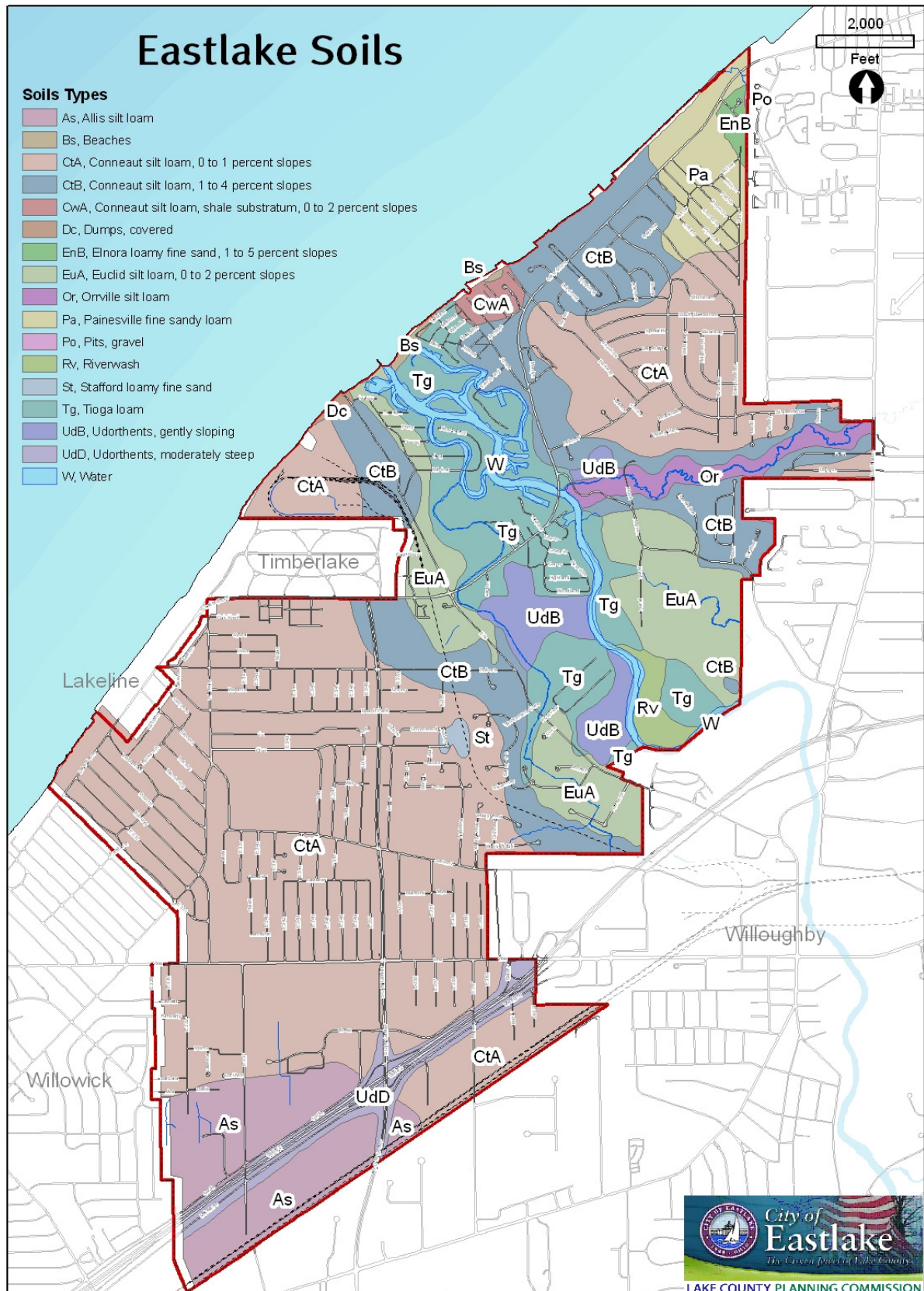
8.3 Soils

The soils divide Eastlake into two areas, the Chagrin River Valley and the lake plain (Map 8.3). The lake plain is made up of Conneaut-Painesville soil series and the Elnora-Stafford series. The Conneaut-Painesville soils are the nearly level and gently sloping, poorly drained soils that formed in the silty, glacial till or loamy material over the glacial till. While the Elnora-Stafford are also nearly level and gently sloping that are also poorly drained, they were formed in water or wind deposited material on beach ridges or offshore bars. Allis silt loam is also present in the lake plain. This is a moderately deep, nearly level, poorly drained soil.

Tiaga-Euclid-Orrville soil series is present in the Chagrin River Valley. This nearly level soil varies between being well drained to somewhat poorly drained. It is formed in alluvial deposits on flood plains and terraces. Riverwash areas are present in the Chagrin Valley. These areas consist of very cobbly and stony areas in the channels of major streams. Fragments are made up of shale and sandstone.

There are several man made soil conditions that exist in the community. The Udorthents soil series are soils that are in cut and fill areas where the topsoil has been removed and the remaining material is typically similar to the subsoil layers. Pits/gravel (soil classifications) are areas where surface mining has been engaged in and aggregate materials have been removed. The dumps/covered (soil classifications) are the opposite, representing miscellaneous areas consisting mostly of broken hunks of cement, bricks and other debris from local construction projects.

Map 8.3: General Soil Inventory



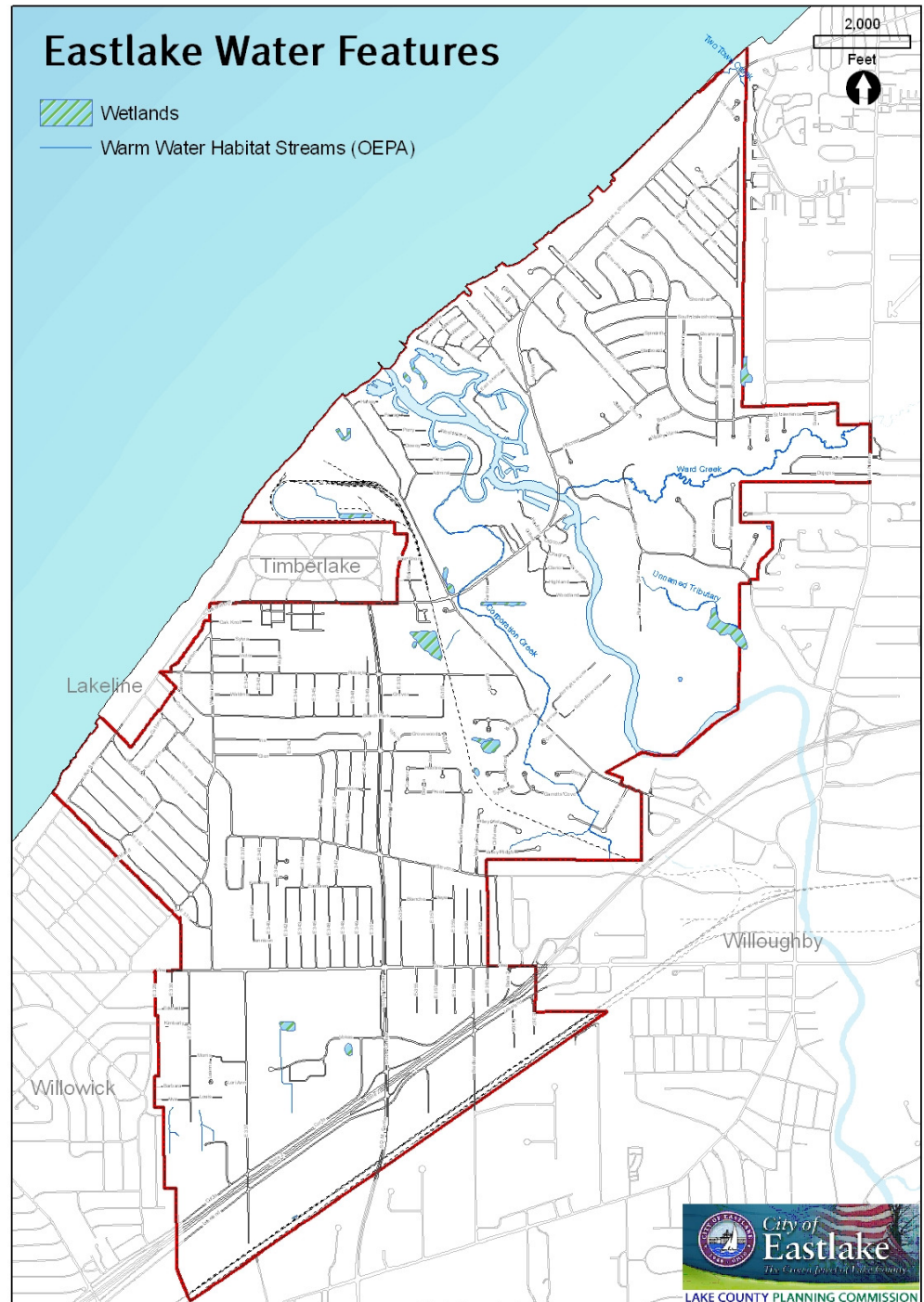
8.4 Wetlands

Wetlands are important components for water quality and quantity. According to the US EPA, wetlands provide water quality protection, fish and wildlife habitat, natural floodwater storage and reduction in the erosive potential of surface water.

In Ohio, 90% of the original wetlands have been destroyed since the 1800s. Locally, development pressures have disturbed a large amount of natural wetlands. ODNR data indicates coastal wetlands along the Lake Erie shore and small pockets of wetlands near the Chagrin River Valley and along the rail corridor servicing the power plant. (Map 8.4).

Mitigation is required for developers who disturb wetlands on site, but the creation of new wetlands often occurs outside of the watershed that has been impacted.

Map 8.4: National Wetland Inventory & Streams



Map 8.4 also notes two primary tributaries to the Chagrin River; Ward Creek and Corporation Creek. Two Town Creek, located in the extreme northeast portion of the city, drains to Lake Erie.

Remaining hydrologic features in the city should be protected from future development. Riparian setbacks are a tool local governments can use to maintain riparian area functions. Riparian areas are naturally vegetated lands along rivers and streams. When appropriately sized, these areas can limit stream bank erosion, reduce flood size flows, filter and settle out pollutants, and protect aquatic and terrestrial habitat. Eastlake can establish riparian setbacks through a combination of landowner education, land acquisition, and land use controls on new development. The Lake County Soil and Water Conservation District, land trusts, and other organizations are skilled in assisting communities and landowners with education and acquisition efforts.

This plan recommends riparian setbacks based on the Chagrin River Watershed Partners model setback ordinance. Riparian setbacks should:

- Range from 25 feet to 125 feet depending on watercourse drainage area.
- Minimum distances apply to both sides of designated watercourses.
- Conform to community land development patterns & natural resource management goals.
- Include provisions for communities to examine the combined impact of all setbacks (side yard, rear yard, riparian, etc.) in a subdivision or a parcel and make reasonable adjustments to ensure existing lots remain buildable, and to maintain lot yields from new subdivisions to the extent possible.

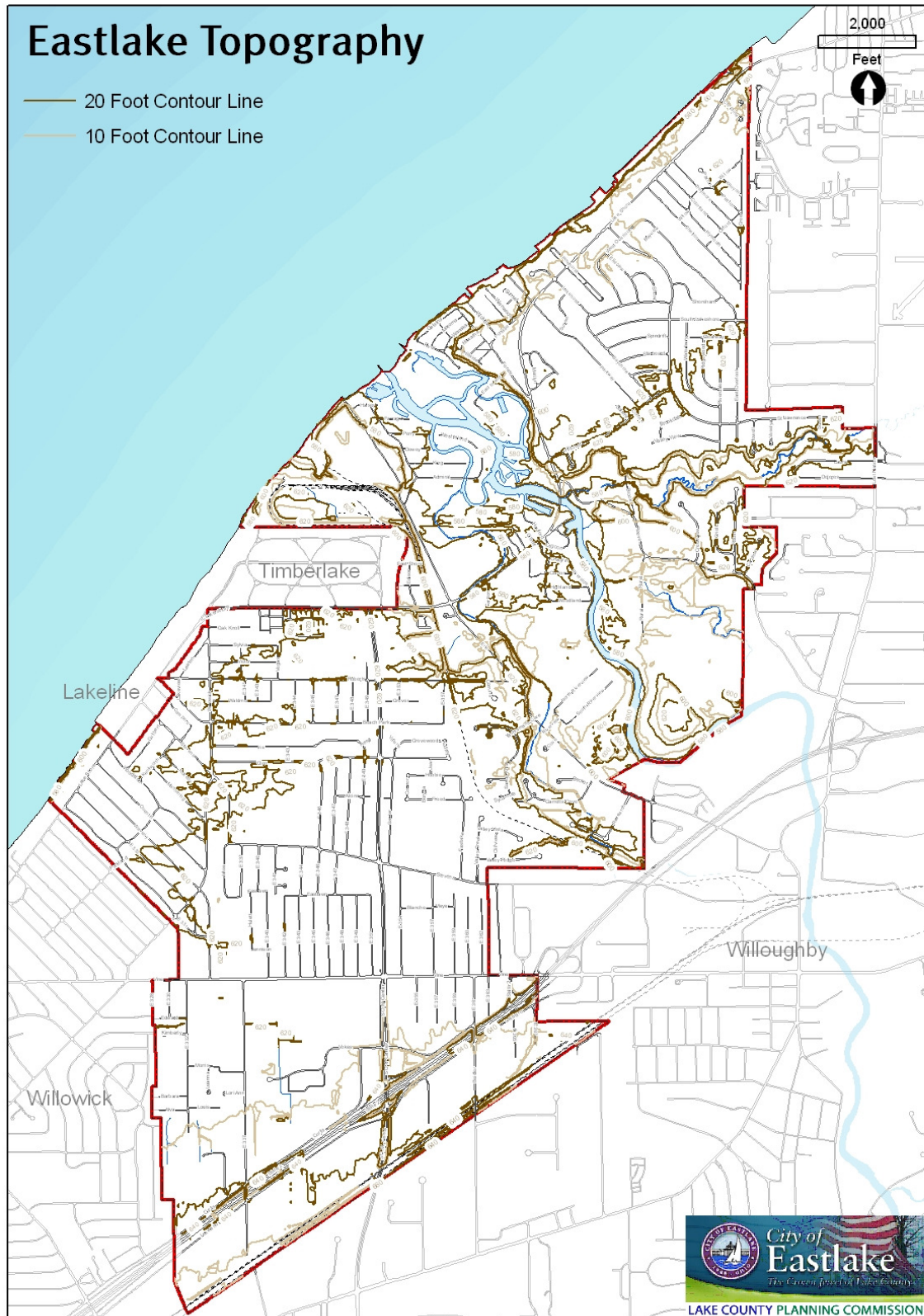
8.5 Topography

The ice age, Lake Erie and the Chagrin River have all defined the topography of Eastlake. The glaciers acted like a bulldozer during the last ice age leaving a surface with a grade of 1 to 4%. After the last ice age ended, Lake Erie rose higher than its current shore, leaving a beach ridge to the south that current day State Route 84, now sits on. After the lake receded to its current location, water, streams, and rivers started forming valleys.

With the exception of the river valley, the majority of the city has minimal topographic concerns (Map 8.5). Along the rim of the Chagrin River, north of the Lakeshore Blvd. bridge, steep slopes (30% or greater) are prevalent (Map 8.6). The contours range from 612 feet at the top of the ridge to 580 feet at the river's edge. Along the Ward Creek corridor, the topography ranges from 588 feet to 620 feet.

Impacts and geotechnical issues should be considered during future development in these areas.

Map 8.5: Topography



Map 8.6: Topography along River Valley



8.6 Lake Erie

Lake Erie, the great body of fresh water forming Ohio's north coast, is the fourth largest of the five Great Lakes and the 12th largest freshwater lake in the world.

The common perception may be that Lake Erie is a timeless entity, formed in the distant past and as ancient as any visible rock or landscape, and a feature that will remain essentially unchanged for eternity. Geologists, however, view Lake Erie, in its present form, as a very recent feature – less than 4,000 years old -- that is destined for a relatively short life, geologically speaking. The known history of the lake and its predecessors has taken place in the last 14,000 years.

The presence of Lake Erie was downplayed in the 1960 Lake County Comprehensive Plan. The plan's future land use map envisioned the Lake Erie coastline as an area lined with medium-to-high density residential uses and heavy industry, with only a few areas untouched by development.

Residents and businesses increasingly recognize that Lake Erie and its tributaries are a rich resource, providing both a natural habitat with few equals and a catalyst for future sustainable economic development.

The Lake County Planning Commission, citizen groups, local government agencies and the State Department of Natural Resources have been working to reverse and avoid the errors of the past, and maintain a healthy balance between the wise use and thoughtful protection of the resources of coastal Lake Erie.

The Western Lake County Coastal Comprehensive Plan was completed in August 2004. The study region of this includes an area 1000 feet shoreward of Lake Erie between the Lake-Cuyahoga county line and the City of Mentor-Painesville Township boundary. The report inventories existing conditions, current and proposed projects, and also examines current and projected needs within the study area (Map 8.7)

That's a lot of H₂O

The Great Lakes contain about 1/5 of all the freshwater on the planet. They contain 95% of the nation's supply of fresh water.

If all the water within the Great Lakes was spread evenly across the United States, the country would be covered under 9.5 feet (3 meters) of water.

Sizing up the Great Lakes

The Great Lakes extend 575 miles (925 kilometers) from the northern tip of Superior to the southern shore of Lake Erie, a spread of eight degrees in latitude.

From east to west, the Great Lakes extend more than 800 miles.

The Great Lakes have more than 10,000 miles (16,000 kilometers) of shoreline, longer than the entire Atlantic and Pacific coasts of the USA.

Lake Erie – Our Great Lake County, Ohio

Lake Erie is the 12th largest freshwater lake in the world.

Lake Erie has 871 miles (1,400 kilometers) of shoreline. There are 262 miles (421 Kilometers) of shoreline in Ohio and at least 26 islands in the western basin of Lake Erie. The exact number varies depending on water levels.

Lake Erie is the most southern, shallowest, warmest and most biologically productive of all the Great Lakes.

Lake Erie supplies more fish for human consumption than the other four Great Lakes combined. The Lake Erie walleye sport fishery is widely considered the best in the world.

Lake Erie's deepest point is 210 feet (64 meters). Lake Erie has three basins: the western basin includes the islands area, the central basin extends from the islands to Erie, PA, and Long Point, Canada, and the eastern basin extends from Erie, PA, to the east end of the lake. The western basin averages 80 feet (24 meters) in depth.

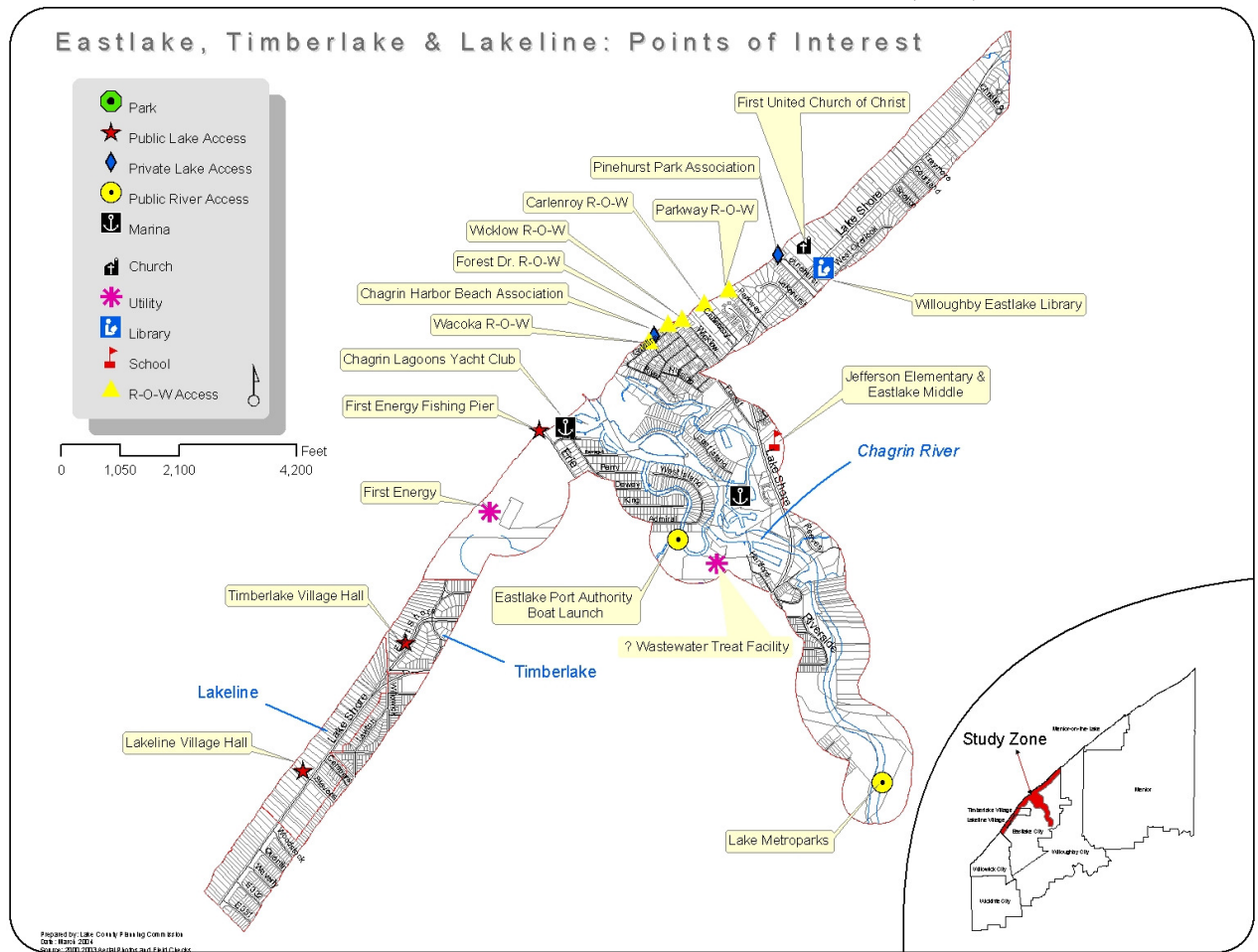
Lake Erie is 241 miles (387 kilometers) long with a widest point at 57 miles (92 kilometers) and the narrowest point at 28 miles (45 kilometers). It covers 9,910 square miles (25,667 square kilometers) and drains 30,140 square miles (78,062 square kilometers).

Ninety-five percent of Lake Erie's water comes from the upper Great Lakes via the Detroit River.

A drop of water entering Lake Erie from the Detroit River will take only two and a half years to reach Niagara Falls. Compare this short time to Lake Superior where a drop of water will take 191 years to move out of the lake.

Source: Lake Erie Coastal Ohio Fact Sheet

Map 8.7: Western Lake County Coastal Plan *Points of Interest* (2005)



A second more detailed study, The Lake County Coastal Development Plan, was completed in 2005. The plan describes the overall coastal environment and documents a plan in response to this environment resulting in an accessible, economically viable and locally relevant Lake County coastline. The creation of the plan is intended to:

- Lead to enhanced grant award leverage created by a regional effort.
- Serve as a catalyst for landside planning of projects at the local or regional level.
- Facilitate the selection of specific coastal projects for implementation.

Although the plan deals mainly with coastal area development, it makes the following recommendations regarding natural resources.

- Local governments should assess their coastal areas, and determine what they need to protect.
- Parkland acquisition costs should include funding for shoreline stabilization projects.
- Develop shoreline protection projects.
- Overall protection of historic and cultural sites, beaches, scenic views, natural resources, natural features and recreational opportunities, as well as the lake itself.

- Control non-point source pollution and stormwater runoff.

In Eastlake, long-term projects include:

- Fishing pier (potential transient boat dockage)
- Off-shore barrier island to create a harbor of refuge
- Increased public access to the Chagrin River and public access to river islands

8.7 Watersheds

A watershed is an area designating where water will flow. If it rains in the southwestern corner of the City, water will flow into a sub watershed in between Euclid Creek to the Chagrin River and eventually enter Lake Erie. Inevitably, water that enters any watershed in the City will make its way into Lake Erie.

Map 8.8 shows three drainage areas of the City: Chagrin River, Lake Erie Direct (east of Chagrin River, west of Grand River), and Lake Erie Direct (west of Chagrin River, east of Euclid Creek).

The city is on the receiving end of upstream development activities which can be indirectly related to flooding and sedimentation concerns. The CRWP is actively working with their member communities to promote best management practices when dealing with storm water management and developments. These measure will prove beneficial to the city over the long-term.

What's a watershed?

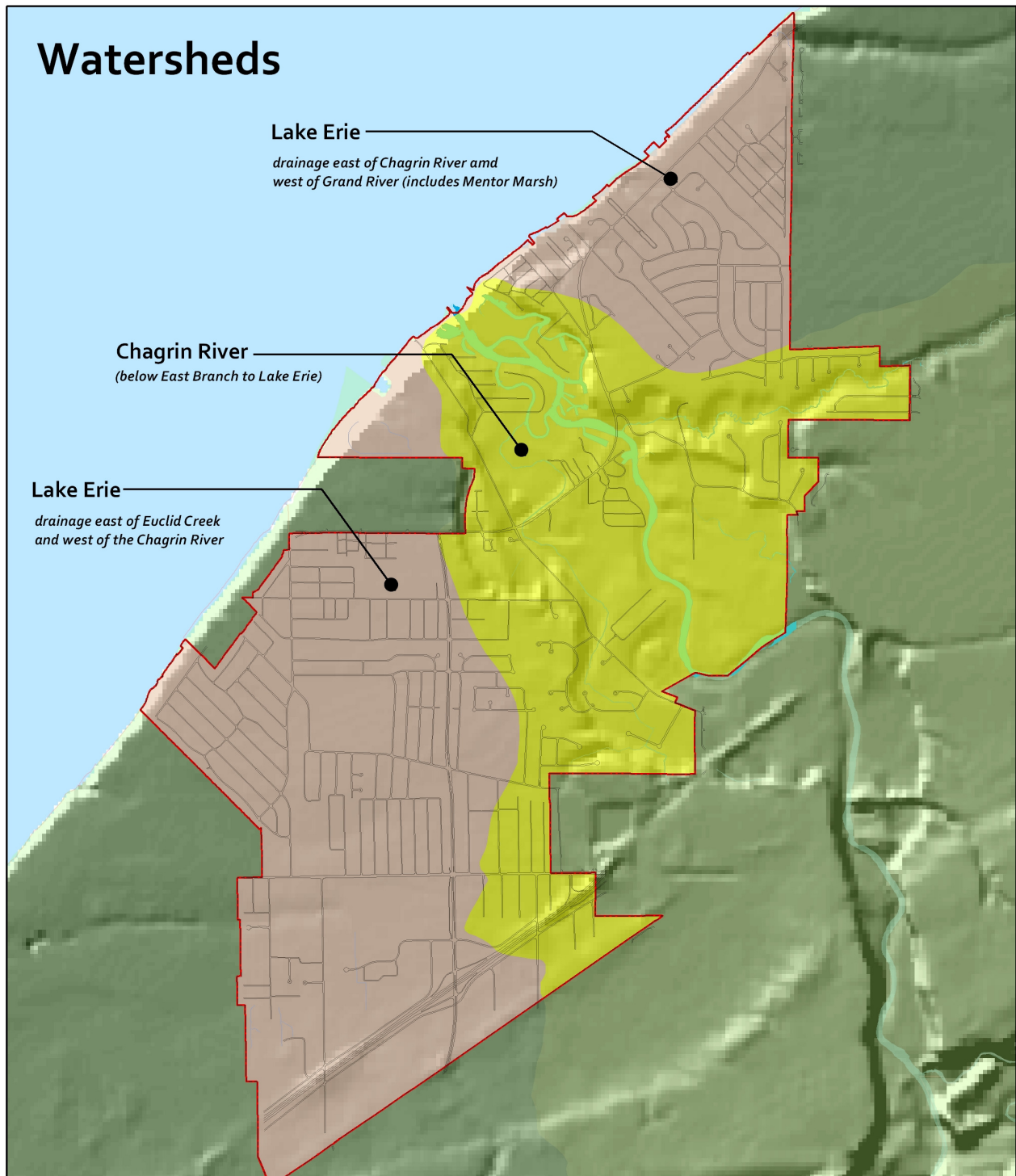
The term watershed describes an area of land that drains downslope to the lowest point. The water moves through a network of drainage pathways, both underground and on the surface. Generally, these pathways converge into streams and rivers, which become progressively larger as the water moves on downstream, eventually reaching an estuary, lake and the ocean. Other terms used interchangeably with watershed include drainage basin or catchment basin.

Watersheds can be large or small. Every stream, tributary, or river has an associated watershed, and small watersheds join to become larger watersheds. It is relatively easy to delineate watersheds using a topographic map that shows stream channels. Watershed boundaries follow major ridgelines around channels and meet at the bottom, where water flows out of the watershed, a point commonly referred to as a stream or river.

The connectivity of the stream system is the primary reason for doing aquatic assessments at the watershed level. Connectivity refers to the physical connection between tributaries and the river, between surface water and groundwater, and between wetlands and water. Because water moves downstream, any activity that affects the water quality, quantity, or rate of movement at one location can affect locations downstream. For this reason, everyone living or working within a watershed needs to cooperate to ensure good watershed conditions.

-- *Watershed Stewardship Education Program Training Guide, Oregon State University and Sea Grant Extension*

Map 8.8: Watersheds



8.8 Non Point Pollution

Nonpoint source (NPS) pollution comes from many sources in both urban and rural areas. Runoff from cropland, parking lots, lawns, mines, and septic systems often contribute to NPS pollution. Pollutants are transported to the surface and ground water by rainfall. During large storms, the runoff to surface water and infiltration to ground water increases, as does the rate of pollutant movement.

Increasingly, NPS pollution originates from urban uses, such as suburban lawns and gardens, street and parking runoff, and construction sites. Urban areas often don't have enough vegetation to slow the rate of contaminant travel. This is evident in areas with high amounts of impervious surface (commercial corridors). This can lead to a faster contamination rate where more highly concentrated pollutants are transported into aquifers.

The Ohio Department of Natural Resources recommends using best management practices to reduce nonpoint source pollution. Best management practices are a management strategy that incorporates both engineering and cultural techniques that have been effective and practical in reducing water contamination. Best management practices include the timely and careful application of fertilizers and pesticides, the construction of filter strips surrounding fields that border a surface water source, and creation and protection of wetlands, which act as filters cleaning sediment, nutrients, and other NPS pollutants.

8.9 Lake Erie Balanced Growth Program (PCA/PDA)

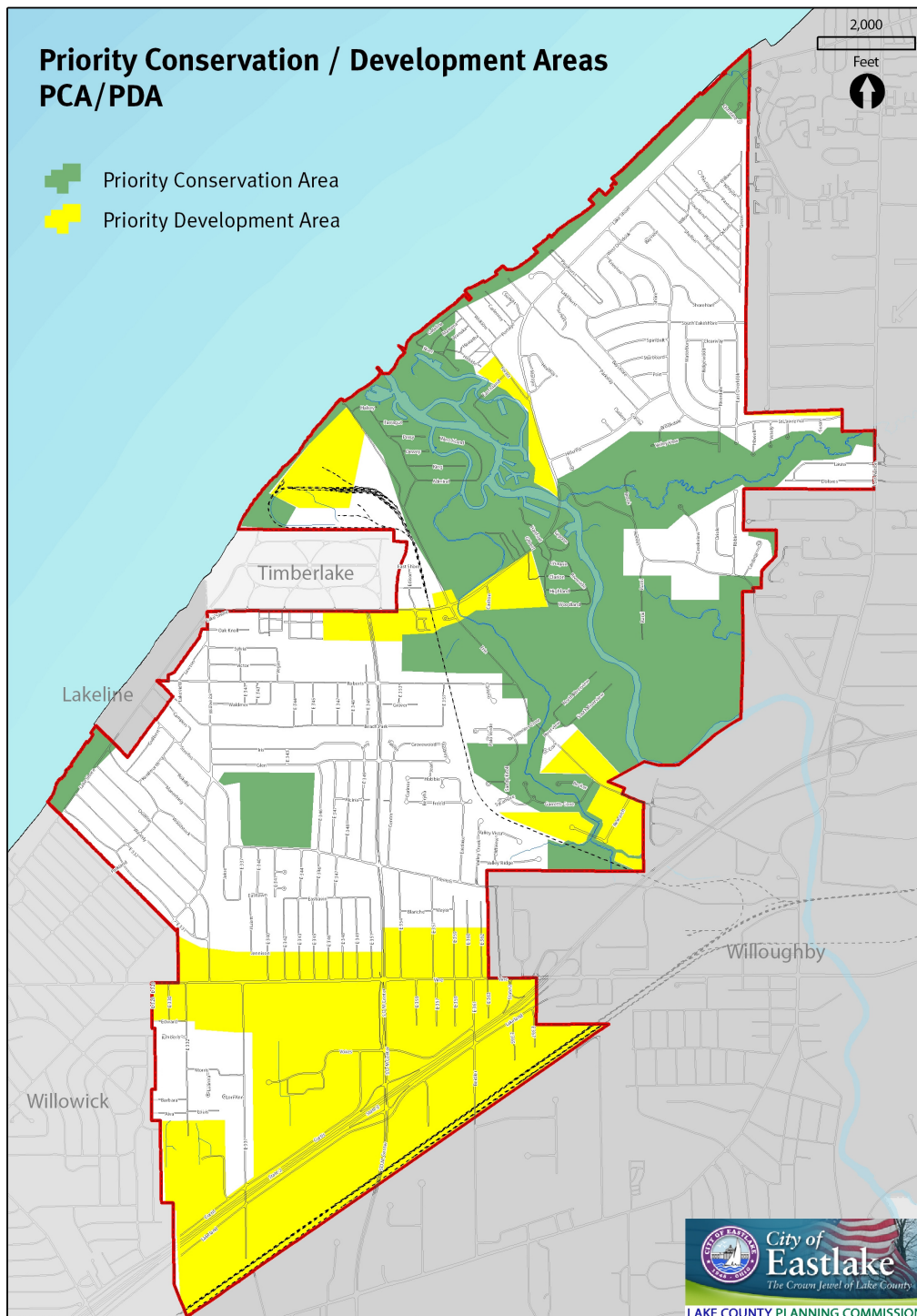
The City of Eastlake Comprehensive Plan will be included in the Chagrin River Balanced Growth Plan. This plan is being developed based on a state wide program for balanced growth being promoted by the Ohio Lake Erie Commission. In 2004 the Ohio Lake Erie Commission finalized the Balanced Growth Program, defined as a *local planning framework to coordinate decisions about how growth and conservation should be promoted by State and local investments*. Through this program, CRWP has been working with local communities to develop Priority Conservation Areas (PCA) and Priority Development Areas (PDA) throughout their community.

- **Priority Conservation Areas (PCAs)** are locally designated area targeted for protection and restoration. PCAs may be important as ecological, recreational, heritage, agricultural, or public access areas. PCAs represent areas where land use change is predicted to have a high impact on the watershed in terms of flooding, erosion, and water quality.
- **Priority Development Areas (PDAs)** are locally designated area where growth and/or redevelopment is to be especially promoted in order to maximize development potential, efficiently utilize infrastructure, revitalize existing cities and towns, and contribute to the restoration of Lake Erie. PDAs represent areas where land use change is predicted to have minimal impact on the watershed and where other conditions, such as access to highways, existing or planned utility service areas, and existing development, suggest that additional development may be appropriate.

The Priority Development Areas (PDAs) and Priority Conservation Areas (PCAs) were developed by the Chagrin River Watershed Partners, Inc. (CRWP). These maps were modified

and refined with input from the Eastlake Economic & Community Development Council, Administration, and LCPC to align with the City's planning goals. In the City of Eastlake, the PDAs include:

- Existing industrial and retail areas,
- Expansion of more intense development potential along the Vine Street Corridor and at the JFK site,
- Possible locations for more intense development near Lakeshore and Chagrin River.



The PDA locations on the attached map reflect areas where future growth and redevelopment activities may be encouraged. Land in a PDA may be eligible for state policy and funding initiatives to encourage and support its development.

The PCA locations shown on the attached map reflect areas that are existing parks and protected properties and also include sensitive slopes, streams, floodplains, and wetlands. In addition the scenic areas along Lake Erie, floodway of the Chagrin River, and lower density residential areas that may be possible to develop or redevelop using conservation development layouts are included as PCAs.

These site characteristics suggest that an area has unique ecologic or historic considerations or may be particularly difficult to develop flooding and erosion concerns. Designation of these areas as PCAs does not indicate that these areas will not be developed, however communities could save time and money working with property owners for preservation or interested developers for alternative site designs that enable development but limit impacts to natural resources on these PCA parcels.

The PCAs and PDAs designated by the City of Eastlake will be included as part of the *Chagrin River Balanced Growth Plan*. This plan will include designation of PCAs and PDAs throughout the Chagrin River watershed.

A key component of the Balanced Growth Program is that, where possible, the state should align policies, programs, and incentives to support the implementation of locally designated Priority Conservation Areas and Priority Development Areas. Communities endorsing the locally designated PDAs and PCAs will be recognized by the State as participating in the *Chagrin River Balanced Growth Plan*. This participation has a number of benefits to local communities. Some of the benefits of participation in the Chagrin River balanced growth planning process include:

- Increased state assistance for local projects.
- Support for local zoning.
- Additional state incentives, such as points on grant applications and lower interest rates on state loan programs.
- General local benefits, including minimizing long-term infrastructure and stormwater management costs and advancing the preservation of the semi-rural character of the city.

This plan encourages the utilization of this tool during the preliminary stages of development discussions in the City.